

Warm-up

<http://youtube.com/watch?v=hLY5/13g2LY&feature=related>

(13) $(x+14)^2 = (x+8)^2 = (x+8)(x+8)$

$$\begin{array}{r} x+14 = x^2 + 16x + 64 \\ -x \quad -14 \quad \quad -x \quad -14 \\ \hline 0 = x^2 + 15x + 50 \\ 0 = (x+10)(x+5) \\ x = -10, -5 \end{array}$$

7-4 Properties of Logs

Solve using calculator

1) $\log 3 + \log 5 = 1.176 = \log 15$

2) $\log 2 + \log 6 = 1.079 = \log 12$

3) $\log 2^3 \cdot \log 5 = .6989 = \log 5$

4) $2 \log 3 = .954 = \log 3^2 = \log 9$

5) $4 \log 6 = 3.112 = \log 1296$

Graph

$$y = \log x^3$$

$$y = 3 \log x$$

Properties of Logs

For any positive numbers M, N, and b --> $b \neq 1$

$$\log_b M + \log_b N = \log_b MN$$

$$\log_b M - \log_b N = \log_b \frac{M}{N}$$

$$K \log_b M = \log_b M^K$$

William Oughtred



- ... the time which over and above those usuall studies i employed upon the mathematicall sciences i redeemed night by night from my naturall sleep, defrauding my body, and inuring it to watching, cold, and labour, while most others tooke their rest.

A History of Mathematical Notations 1647

Lets apply these properties

Ex 1

$$\log_3 20 - \log_3 4 = \log_3 5$$

http://www.algebralab.org/lessons/lesson.aspx?file=Algebra_LogarithmProperties.xml

Ex 2

$$3 \log x + \log y$$

$$\log x^3 + \log y$$
$$\boxed{\log x^3 y}$$

Ex 3

$$3 \log 2 + \log 4 - \log 16$$

$$\log 2^3 + \log 4 - \log 16$$

$$\log 8 + \log 4 - \log 16$$

$$\log 32 - \log 16$$

$$\log 2$$

Ex 4

$$\log 8 - 2 \log 2 + \log 3$$

$$\begin{aligned} & \log 8 - \log 4 + \log 3 \\ & \quad \searrow \quad \nearrow \\ & \log 2 + \log 3 \\ & \quad \circlearrowleft \\ & \log 6 \end{aligned}$$

Now expand each

Ex 1

$$\log_5 x/y$$

$$\log_5 x - \log_5 y$$

Ex 2

$\log 3r^5$

$$\log 3 + \log r^5$$

$$\log 3 + 5 \log r$$

$$p_4 \begin{matrix} 328 \\ 12-34 \text{ F.O.E.} \end{matrix}$$

Ex 3

Questions